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Orion, Thunderwell and Nuclear Space Coverage From Nigel Cook's

Blog

January 26, 2016 by [Joseph](#)



By Brian Wang, [Nextbigfuture.com](#) with info from Gotion, CATL, Tesla, The Limiting Factor [as of Aug 31, 2023]

	Cell	Pack	Volumetric Energy	Cycle
Sodium Gen 1	160 Wh/kg			3000
Sodium Gen 2	200 Wh/kg			3000
LFP	160 Wh/kg		450 Wh/l	3000
LFP Latest	180 Wh/kg		450 Wh/l	3000
LFP Next	200 Wh/kg			
CATL M3P (2023)	210 Wh/kg	160 Wh/kg	450-500 Wh/l	2000
Gotion L600 (2024)	240 Wh/kg	190 Wh/kg	525 Wh/l	4000
NCA (Tesla 2023)	255 Wh/kg			1200
NCA (Near term)	350 Wh/kg			
CATL Condensed	500 Wh/kg			
China Lab lithium (2023)	711 Wh/kg			
2030 superlithium (Est)	1000 Wh/kg			

A guest article by [Joseph Friedlander](#)

Nigel B. Cook's Glasstone.Blogspot Blog has beautiful coverage of the Orion and Thunderwell projects. But it is lost in a huge blog page

Categories

Select Category



here. <http://glasstone.blogspot.co.uk/2006/04/ten-largest-nuclear-tests.html>

Cook is a master researcher who digs up incredible piles of research on all topics nuclear and that long page is no exception. The following is a repost of the relevant material on that page.

I should emphasize that below the line is all Nigel's work which is lost to the casual reader deep in the above link.

Note: At the very bottom is comment by an anonymous commentator on the original blog page *in italics* from the above post page giving data on the silver age of speculative studies in the 1950s including Kraft Ehrlicke, Dr. Dandridge MacFarlan Cole, and others including early military moonbase studies. There are no links in the original, just references. I include it here because of the study names which may be of interest to future researchers.

Plenty more links movies and references at the original at the link above.

From this point forward, Nigel B. Cook:

...Project Orion, the only economic practical way for human beings to holiday on Mars. (Excerpt from BBC's To Mars by A-Bomb (2003), with footage of the tests and comments by Arthur Clarke and Freeman Dyson.) The Orion spacecraft has a large thick steel pusher plate connected via hydraulic dampers to the crew accommodation. A series of nuclear explosions is detonated below the pusher plate, which shields the

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crew from nuclear radiation and recoils upwards when ablated by X-rays. The impulses from nuclear weapon explosions efficiently accelerate the spacecraft to high speed. It would have been launched to Mars from the Nevada nuclear test site, using relatively clean low fission yield detonations for the first few minutes (to minimise the EMP, air blast and fallout effects on Earth), and then larger detonations when a safe distance away.

Project Orion was headed by Los Alamos nuclear weapons designer Dr Theodore Taylor, who developed many nuclear weapons (Scorpion, Wasp, Bee, Hornet Nevada tests, and the 500 kt pure fission implosion bomb tested as the IVY-KING shot in 1952). (The idea of utilizing explosions for work is not so crazy as it sounds, when you remember that the internal combustion engine doesn't 'burn' gasoline, it explodes it in a controlled way within the cylinder after mixing fuel with air and compressing the resulting mixture, and the engine converts the impulsive force of the explosion into useful work energy done against the piston to produce motion. Maybe a massive version of such a piston-in-cylinder engine could utilize recoil forces caused by thermonuclear explosions, which are more cost-efficient for releasing energy than the operation of a nuclear reactor to generate steam to power turbines.)

There were several other nuclear rocket systems as alternatives to Orion, although Orion is by far the best. One alternative was Project Thunderwell,

<http://glasstone.blogspot.com/2006/03/emp-radiation-from-nuclear-space.html>

the steam accelerated Jules Verne capsule, which was suggested by the speed of at least 6 times earth's escape velocity, achieved by the 10-cm thick, 1.2 m diameter steel cover blown off the top of the 152 m shaft of the 0.3 kt Plumbbob-Pascal B

[More Pictures and Video of the SpaceX Starship Launch](#)

underground Nevada test on 27 August 1957. In that test, a 1.5 m thick 2 ton concrete plug immediately over the bomb was pushed up the shaft by the detonation, knocking the welded steel lid upward. This was a preliminary experiment by Dr Robert Brownlee which ultimately aimed to launch spacecraft using the steam pressure from deep shafts filled with water, with a nuclear explosion at the bottom; an improvement of Jules Verne's cannon-fired projectile described in *De la Terre à la Lune*, 1865, where steam pressure would give a more survivable gentle acceleration than Verne's direct impulse from an explosion. Some 90% of the radioactivity would be trapped underground.

Like Project Orion, Project Thunderwell was cancelled for pseudoscientific (political) reasons after the nuclear test ban treaty was signed.

Another nuclear rocket system was simply to use a bare, uncluttered nuclear reactor core to directly heat hydrogen gas to high temperature and then expel it from an exhaust nozzle in lieu of burning it with oxygen. This was NASA's Kiwi rocket, which was extensively tested (producing a lot of radioactivity in the atmosphere) but, you guessed it, never deployed! The advantage of it is that you need to carry less fuel, because you're not burning hydrogen, you're just ejecting it to get a recoil by Newton's 3rd law of motion, and by ejecting it at high speed (fast hydrogen molecules) due to nuclear reactor heating, it can be more efficient than a conventional rocket engine.

There should be a note here about how unnatural radioactive pollution is (not) in space: the earth's atmosphere is a radiation shield equivalent to being protected behind a layer of water 10 metres thick. This reduces the cosmic background radiation by a factor of 100 of what it would be without the earth's atmosphere. Away from the largely uninhabited poles, the Earth's magnetic field also protects us against charged

cosmic radiations, which are deflected and end up spiralling around the magnetic field at high altitude, in the Van Allen trapped radiation belts. On the Moon, for example, there is no atmosphere or significant magnetic field so the natural background radiation exposure rate at solar minimum is 1 milliRoentgen per hour (about 10 microSieverts/hour) some 100 times that on the Earth (0.010 milliRoentgen per hour or about 0.10 microSieverts/hour). The Apollo astronauts visiting the Moon wore dosimeters and they received an average of 275 milliRoentgens (about 2.75 milliSieverts) of radiation (well over a year's exposure to natural background at sea level) in over just 19.5 days. It is a lot more than that during a solar flare, which is one of the concerns for astronauts to avoid (micrometeorites are another concern in a soft spacesuit).

The higher up you are above sea level, the less of the atmosphere there is between you and space, so the less shielding you have to protect you from the intense cosmic space radiations (emitted by thermonuclear reactors we call 'stars', as well as distant supernovae explosions). At sea level, the air above you constitutes a radiation shield of 10 tons per square metre or the equivalent of having a 10 metres thick water shield between you and outer space. As you go up a mountain or up in an aircraft, the amount of atmosphere between you and space decreases, thus radiation levels increase with altitude because there is less shielding. The normal background radiation exposure rate shoots up by a factor of 20, from 0.010 to 0.20 milliRoentgens per hour, when any airplane ascends from sea level to 36,000 feet cruising altitude. (The now obsolete British Concorde supersonic transport used to maintain radiation-monitoring equipment so that it could drop to lower-altitude flight routes if excessive cosmic radiation due to solar storms were detected.) Flight aircrew get more radiation exposure than many nuclear industry workers at nuclear power plants. Residents of the high altitude city of Denver get 100 milliRoentgens (about 1 milliSievert) more annual exposure than a resident of Washington, D.C., but the mainstream anti-radiation

cranks don't campaign for the city to be shut to save kids radiation exposure, for mountain climbing to be banned, etc.!

The point I'm making here, for the Green Warriors, is that a nuclear-powered rocket won't be a horrible unnatural thing polluting nice pristine non-radioactive 'clean' outer space with horrible human produced radioactive waste: the universe is full of nuclear reactors (called stars purely for reasons of political expediency) and unending nuclear explosions (called supernovae purely for reasons of political expediency). Live with it!

... Project Orion, which could be built today with existing technology if there was not insane groupthink about nuclear test effects. Dr Theodore Taylor gives the full technical details in John McPhee's book *The Curve of Binding Energy*, 1974. Cosmic radiation is 100 times higher in space than on the Earth's surface. The EMP and fallout effects could be suppressed by clean weapons designs with thick casings to absorb prompt gamma radiations (see blog posts [here](#), [here](#), [here](#), and [here](#)). Note: Links at original post, <http://glasstone.blogspot.co.il/2006/04/ten-largest-nuclear-tests.html>

Summary of Project Orion from Dr Taylor:

Project Orion began in 1958 when nuclear weapons designer Dr Theodore B. Taylor moved to General Atomic to design a nuclear bomb powered spaceship, sponsored by the U.S. Advanced Research Projects Agency. It would travel directly (in a straight line!) and quickly to Mars using 2,000 nuclear bombs, carrying 150 people and attaining a top speed of 45 km/second. The travel time would be 3 months for the minimum distance to Mars of 56 million km and 6 months for the maximum Mars-Earth distance of 101 million km. In 1959 the stability of the entire system was completely proved in a

scaled-down demonstration test which impressed Dr von Braun so much that he supported Project Orion after seeing the demonstration film.

Above: blueprints for the nuclear rockets from R. S. Cooper, "Nuclear propulsion for space vehicles", Annual Review of Nuclear Science, v18, 1968, pp. 203-228. To resist the high temperatures, metals like tungsten (which has a very high melting point) are preferred to steel for the surface of the pusher. Graphite in a thin layer of droplets can be sprayed on to the pusher plate by retractable jet nozzle located within the central hole in the pusher plate. More advanced designs use a concave shaped pusher which detonates the bomb at the focus, to utilize a larger fraction of the case shock and X-ray ablative recoil energy. Project Orion was first proposed by Dr Stanislaw Ulam, of Teller-Ulam fame. It was developed by Dr Theodore Taylor at General Atomic.

Dr Taylor says in The Curve of Binding Energy (by McPhee) that the idea stemmed from the 15.2 kt REDWING-INCA nuclear test on June 26, 1956, where 30 cm diameter carbon-coated steel balls were placed 9 metres from the bomb by researcher Lew Allen, and were undamaged with only a loss of 0.1 mm of surface graphite! This gave rise to the design of the 75 ton, 41 metre diameter carbon-coated steel base pusher plate in the 76 metres high Project Orion spacecraft, where the base pusher plate is connected by hydraulic shock absorbers to the crew compartment. The steel plate acts as a radiation shield as well as ablative recoil mechanism to get propulsion: after each bomb was fired, oil would be sprayed on the plate to give it a carbon coating. The dynamics of X-ray ablation are well established in nuclear weapons design because this mechanism is what is used to cause the fusion stage in a bomb to explode: X-rays from the fission stage are channelled to the fusion stage, ablating the surface which causes a compression by recoil (Newton's 3rd law).

The nuclear test fireball experiments of Project 5.4 during Operation TEAPOT in Nevada, 1955, Project 5.9 of Operation REDWING at Bikini Atoll and Eniwetok Atoll in 1956, and then Project 8.3b of Operation PLUMBBOB in Nevada, 1957 proved that objects like steel spheres in the fireball only suffered a tiny amount of surface scarring because the thermal pulse just ablates a microscopic thickness of the surface, causing a recoil force. Actually, this kind of thin layer ablation had first been noted back on the TRINITY test of July 16, 1945:

'The measured total radiation at [9.1-km] from the centre was 0.29 calories/cm² ... Examination of the specimen exposed at [975 m] shows ... the charred layer does not appear to be thicker than 1/10 millimetre.... scorching of the fir lumber used to support signal wires extended out to about [1.9 km] ... the risk of fire due to the radiation ... is likely to be much less than the risk of fire from causes existing in the buildings at the time of explosion.'

– W. G. Marley and F. Reines, July 16th Nuclear Explosion: Incendiary Effects of Radiation, Los Alamos report LA-364, October 1945, originally Secret, pp. 5-6.

Dr Taylor explained that the first nuclear bomb to start ascent would only need to be 0.1 kt, the next a second later would be 0.2 kt, and so on up to bomb number 50 which would be 20 kt, by which time a total of 200 kt would have been detonated, and the spacecraft would then be in space without having caused any significant EMP or fallout damaging effects on the Earth compared to natural background radiation. There would be no radioactive trail left in space behind such a nuclear pulse rocket because the debris expands at a rate faster than the escape velocity of the solar system. The pusher plate would not be severely heated or damaged because of the 10 nanosecond duration of the ablative X-ray impulse from a nuclear explosion 60 metres away, which only ablates the surface layer (such as the layer of carbon rick grease sprayed on the

pusher plate automatically after each detonation). Remember that in an automobile engine, the temperature attained by the exploding gasoline and air mixture is much higher than the melting point of the steel pistons and cylinders, but the latter don't melt because the duration of each explosion is too brief to heat up the material to that temperature, so the residual heat after expansion doesn't penetrate and destroy the piston and cylinder, but rapidly cools and ends up as warm exhaust gas!

"Observations of the remains of towers and shielding material after detonation at several ground zeros indicate that large masses of material are not vaporized. Observations of the residue of the Smoky tower [44 kt bomb atop a 700 foot high steel tower] indicated that a very significant portion of that tower remained, including the upper 200 feet of steel. Another example similar to Shot Smoky was Shot Apple II [29 kt atop a 500 ft steel tower], Teapot Series. Even though the total yield of Shot Apple II was about [29 kt], the floor of the cab [housing the nuclear bomb itself, at the top of the tower] and the main tower support columns remained intact. The results of the Shot Fizeau [11 kt atop a 500 ft steel tower] tower melt studies (W. K. Dolen and A. D. Thornborough, Fizeau Tower Melt Studies, Sandia report SC-4185, 1958, Secret) show that about 85 percent of tower material was accounted for after the detonation and that only the upper 50 feet of tower was vaporized. No melting occurred beyond 175 feet from the top of the tower although the fireball theoretically engulfed more than 400 feet of the tower."

– Dr Kermit H. Larson, et al., Distribution, Characteristics, and Biotic Availability of Fallout, Operation Plumbbob, weapon test report WT-1488, ADA077509, July 1966, page 59.

[http://oai.dtic.mil/oai/oai?
verb=getRecord&metadataPrefix=html&identifier=ADA077509](http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA077509)

J. E. Kester and R. B. Ferguson report in Operation Teapot, Project 5.4, Evaluation of Fireball Lethality Using Basic Missile Structures, WT-1134 (originally Secret – Restricted Data), AD0340137, that within the 23 kt Teapot-Met (Nevada, 15 April 1955, 400 ft steel bomb tower) although the bomb test steel tower was blown down, it was not vaporized and much survived despite having been engulfed by the fireball itself, as stated on page 30:

“... nearly 225 feet of the main support members of the shot tower were still intact and laid out radially from their original position.”

Page 116 of WT-1134 states that after the 2 kt Moth shot atop a 300 foot triangular tower on 22 February 1955: “The three tower legs were laid out approximately radially from their pre-shot positions. The longest tower leg found was about 200 ft long. The other two legs appeared to be about 150 ft long. All three guy cables were still attached ... A few large pieces of the tower, about 20 to 30-ft long, were strewn to ranges of about 200 feet.” It adds that after the 7 kt Tesla shot atop a 300 ft square tower on 1 March 1955: “the four tower legs ... were laid out radially from their original position ... The tower legs remained intact to lengths of about 125 feet. All four guy cables were still attached ...” The 43 kt Turk nuclear test was fired atop a 500 ft square tower, leaving 100 ft lengths of tower lengths on the ground (page 118). The 8 kt Bee shot atop a 500 ft tower failed to even knock down most of the tower (pages 120-1): “A large portion of this tower was still standing after the shot. ... It is estimated that at least 150 feet of the tower was essentially undamaged and standing erect with an additional 50 to 75 feet of the tower slightly melted and drooped over at the top.” The 14 kt Apple 1 shot atop a 500 ft square tower results (page 121): “The main support members of the shot tower still remained to lengths of about 150 feet with the top 25 to 50 feet being crushed and split ... Some of the legs remained attached to the base.” The 23 kt Met shot was atop a 400 ft square tower (pages 123-4): “About 225 feet of

the tower legs were still intact with the top 25 to 50 feet being crushed, split and slightly melted”

Above: color photo shows the lower 200 feet surviving from the 300 ft steel tower of the 0.2 kt Ruth nuclear test in Nevada on 31 March 1953. The black and white photographs are from the 23 kt Teapot-Met nuclear explosion (Nevada, 15 April 1955) ablation tests by J. E. Kester and R. B. Ferguson, Operation Teapot, Project 5.4, Evaluation of Fireball Lethality Using Basic Missile Structures, WT-1134 (Secret – Restricted Data), AD0340137, which showed that at just 80 feet only the outer 0.4 inch of steel balls was ablated by the fireball.

The error in the popular myth that everything is vaporized in the fireball is that the cooling rate of the fireball is so great that there is literally not enough time for the heat to penetrate more than a thin surface layer before the temperature drops below melting point. Good heat conductors like steel are protected by ablation. A very thin surface layer of the material is vaporized, protecting the underlying material, just as occurs with thermal radiation striking wooden houses (Glasstone and Dolan, The Effects of Nuclear Weapons):

References:

J. C. Nance, 'Nuclear Pulse Propulsion', IEEE Transactions on Nuclear Science, February 1965, p. 177.

T. W. Reynolds, 'Effective Specific Impulse of External Nuclear Pulse Propulsion Systems', Journal of Spacecraft and Rockets, October 1973, p. 629.

[http://ntrs.nasa.gov/search.jsp?](http://ntrs.nasa.gov/search.jsp?R=927362&id=6&as=false&or=false&q=Ne%3D35%26Ns%3DHarvestDate%257c1%26N%3D4294967259%2B4294967231)

[R=927362&id=6&as=false&or=false&q=Ne%3D35%26Ns%3DHarvestDate%257c1%26N%3D4294967259%2B4294967231](http://ntrs.nasa.gov/search.jsp?R=927362&id=6&as=false&or=false&q=Ne%3D35%26Ns%3DHarvestDate%257c1%26N%3D4294967259%2B4294967231)

'The President put his name on the plaque Armstrong and Aldrin left on the moon and he telephoned them while they were there, but he cut America's space budget to the smallest total since John Glenn orbited the Earth. The Vice-President says on to Mars by 1985, but we won't make it by "stretching out" our effort. Perhaps NASA was too successful with Apollo. It violated the "Catt Concept", enunciated by Britisher Ivor Catt. According to Catt, the most secure project is the unsuccessful one, because it lasts the longest.'

– Robert P. Crossley, Editorial, Popular Mechanics, Vol. 133, No. 5, May 1970, p. 14.

E.g., compare the Apollo project with the Vietnam war for price, length and success. Both were initially backed by Kennedy and Johnson as challenges to Communist space technology and subversion, respectively. The Vietnam war – the unsuccessful project – sucked in the cash for longer, which closed down the successful space exploration project!

<http://books.google.co.uk/books?>

[id=8dcDAAAAMBAJ&pg=PA14&lpg=PA14&dq=Ivor+Catt+%22Catt+Concept%22+N](http://books.google.co.uk/books?id=8dcDAAAAMBAJ&pg=PA14&lpg=PA14&dq=Ivor+Catt+%22Catt+Concept%22+N)

[ASA&source=bl&ots=Mfk4GTctb4&sig=OusWSTqfnuOJ-Y6o3ZatPySWBpl&hl=en&ei=O3BITJPBAYmM0gTZ0ei3DQ&sa=X&oi=book_result&ct=result&resnum=1&ved=0CBUQ6AEwAA#v=onepage&q=Ivor%20Catt%20%22Catt%20Concept%22%20NASA&f=false](https://www.nextbigfuture.com/2016/01/orion-thunderwell-and-nuclear-space.html)

....APPENDIX I Comment by Anonymous

Anonymous said...

SR-181 was huge study for dozens of weapon systems:

"Cold War American Spacecraft Projects and the "Paperclip" connection.

The Allied Intelligence units...specifically U.S. in nature infuriated, angered, and outfoxed our allies (French, Canadians, British, and of course the Russians), by initiating "Operation Plunder," within it being "Operation Paperclip" the collection of scientists, engineers, technicians, technology, etc., and to prevent the talented Germans from slipping out of Germany via any "ratline," were hunted within another project called "Safeghavan:" Safeghavan was specifically created to prevent wherever possible, talented Germans from slipping out of Germany, Austria and other German occupied nations, to continue their research in other nations-specifically, South America. Source; Secret Agenda, Linda Hunt, St. Martin's Press, 1991.

Part. 1.

At 2:38 pm, Anonymous Anonymous said...

Part.2.

During the 1950s G. L. Martin Aircraft of Baltimore, Maryland possessed an Advanced Design Teams department. Martin Design Teams presided over by George S. Trimble, was involved in pure science, future over-the-horizon advances in aeronautics, anti-gravity and its applications, nuclear propulsion for aerial vehicles, and the little publicized lenticular aircraft-spacecraft design studies plus studying and applying natural phenomena or the laws of nature, and advanced missile-spacecraft design.

Source: Aviation Week, October 18, 1953.

Martin Aircraft at their Middle-River, Maryland facility reorganized one facility into a special subsidiary that was born in 1946, and was engaged in the guided missile field. In the 1950s specific Design Teams operated within a separate unit known as RIASI- Research Institute for Advanced Study Incorporated, and performed building-block research into varied projects. This streamlined unit engaged in various missile projects, electronics, electro-mechanical weapons systems, and especially to "make the spaceship respectable," and solve the problems of space travel. Another RIAS goal was to close the gap between basic scientific discoveries and their applications to engineering problems in their various projects.

Source: Aviation Week June 3, 1957.

At 2:39 pm, Anonymous Anonymous said...

Part.3.

The most exotic division other than RIAS was the Martin-Denver facility (where the Martin Titan series ICBM and follow-on heavy boosters), where a research unit known internally as "Force XXIV" became heavily involved in advanced space research. One aspect was to study and apply spacecraft for military applications in an area defined as a "synchronous corridor-an area 19,340 miles into space directly over the Earth's equator. Other space-flight avenues proposed were Macro-Life spacecraft and the self-conscious, self-repairing Micro-life craft that protectively housed a human colony of space-farers. Also studied were "planetoid" or Astroid harvesting, hollowing large Astroids out to transform them into deep space exploration outside of our own Solar System. One of the more extreme thinkers based at Martin Denver was Dr. Dandridge MacFarlan Cole a high level engineer proposed some of the most extreme and advanced projects concerning human space travel. Martin Museum and other historians have spoke in very denigrating terms of Dr. Cole that border on the charge of insanity among other terms.

Aerospace author Lloyd Mallan was one of a very few writers who received the invitation for a grand tour of the Martin-Denver facilities. He wrote up the numerous space research projects at "Force XXIV" in his quite revealing book "Space Science," based mostly upon the work of "Force XXIV." In fact, Mr. Mallan is the only author who provided an in-depth report complete with photography, drawings, and projects being studied inside the Martin-Denver facility.

Source; Missiles and Rockets, July 19, 1965.

Time Magazine January 27, 1961 within the Science column.

Many people are familiar with the split-up of the original German Peenemunde Rocket Research Center Team-von Braun and his team surrendering to the American Forces, while the other half surrendered to the Russians. The rest is history.

What is not known is that many German lesser known scientists-engineers-technicians were involved in numerous American space projects, many of which would be applied to what the USAF secretly created immediately after the initial Russian Sputnik series were launched. The USAF SR-181 Strategic Orbital System, encompassed a series of weapon systems and support spacecraft constituting the T.O. (Table of Organization) of a tightly classified USAF organization known as EOMSF...Earth Orbital Military Space Force, with a planned operational timeframe between the late 1960s and early 1970s. This very thorough study is still classified today.

A few known German scientists and engineers absorbed into the U.S. Aerospace community that were directly involved in hypersonic boost-glider spacecraft studies were:

Bell Aircraft;

Dr. Walter R. Dornberger Bell's chief Guided Missile Specialist cum Chief Scientist and before retirement, Vice President for Research. Responsible for Bell initiating a series of

continuous rocket powered and rocket boosted reconnaissance-bombardment glider project studies, operated up to orbital speeds and altitudes, including the final follow-on to other projects...the Dyna Soar I contract.

Ing; Rudolph H Reicher joined Bell 1953, R&D on rocket engines, and in 1959 joined Boeing Airplane Company performing Propulsion Analysis and Interaction work.

At 2:40 pm, Anonymous Anonymous said...

Part.5.

Dr. Krafft A. Ehrlicke engineer-physicist worked for Dr. Dornberger at Bell Aircraft and left to join Convair in San Diego to work on the Atlas ICBM and Centaur Projects.

Heinz Mueller joined the Bell Aircraft Rocket Laboratory in 1950 and created "thrust chambers" and associated rocket motor work.

Dipl. Ing. Daus Chamburg-Harburg specialist in rocket-transportation and;

Dipl. Ing. Wilhelm Emil Schlitt specializing in Guidance Systems may have worked at Bell Aircraft.

Dipl. Haas or Haase of which little is known who was German and worked at Bell Aircraft on unspecified projects...either rocket engines or their Rocket Boosted reconnaissance-bombardment glider projects.

A brief list of advance and cutting-edge Bell Projects are;

At 2:42 pm, Anonymous Anonymous said...

Part.6.

MX-2145 cum MX-2276 BoMi

R459L "Hi Fi Recce" a.k.a. "Brass Bell."

System 118P two phase aircraft and glide-rocket study.

Study Requirement or SR-126 RoBo.

R464L Dyna Soar I cum RS-620A Dyna Soar.

Hypernias I and Hypernias II EMS...Energy Management System for Dyna Soar, SLOMAR, Lenticular Re-entry Saucer spacecraft, and all Lifting-Body Spacecraft designed by other firms.

Ramora Space Maintenance Vehicle in conjunction with Model 7045 Saucer spacecraft and their Orbital Bombardment Station or Platform.

Nuclear armed Reentry Missile in conjunction with Bell or Martin Orbital Bombardment Platforms.

REACTION CONTROL MOTOR Contracts Boeing Dyna Soar and various spacecraft projects..

Bell's Lenticular spacecraft studies culminating in the Bell Model 7045 Modified Lenticular Re-entry Vehicle submitted for the Apollo Project, to service Orbital Bombardment Platforms within the SR-181 Strategic Orbital System study.

Continuous USAF-NASA Contracts to continue to develop and refine Bell Aircraft's Patented double-wall liquid and solid insulation systems for hypersonic vehicles that included winged orbital weapons systems that must negotiate a glide-reentry into earth's sensible atmosphere. This author has now discovered that such contracts involved double-wall cooling-insulation panels, test sections, and boost-glider fuselage-wing cross

sections that were refined and actually flight-tested and wind tunnel tested. Bell's future research was agreed upon by Larry Bell and Dr. Dornberger in 1951. The double-wall cooling-insulation system contract series ran as late as 1968, such was the confidence the USAF and Bell exhibited in their lengthy research work.

G.L. Martin Aircraft;

NOTE-the following individuals were nicknamed "The Blue Angels," despite being assigned to the Dyna Soar I competition with Bell Aircraft against the Boeing-Vought Team. The Middle-River Plant (probably the RIAS Department), where they work was painted throughout the building with two shades of Blue paint, hence the term "Blue Angels."

Hans Multhopp; A Director and Principal Scientist under Martin Dyna Soar I boss...Mr. Bastian (Buz) Hello, also involved in design of the Martin-Bell Dyna Soar I and lifting-body spacecraft.

Dr. Peter Friedrich Jordan, structural specialist assigned to Martin-Bell Dyna Soar I Project and other Martin spacecraft projects.

Dr. Julius Friedrich Vandrey; Aerospace Physics also assigned to Dyna Soar I.

The above list of course, is by no means complete and it is curious that other Germans constituting a list of approximately 1,500 plus German-Austrian scientists and other talented people are not listed as to their employment either within the U.S. Government, Industry, the military branches and other sources.

At 2:42 pm, Anonymous Anonymous said...

Part7.

MARTIN PROJECTS;

ASTROROCKET

START PROGRAM.

PILOT/PRIME

S-5

M-103, SV-5, X-24A X-24B, X-24C-FDL.

X-23A Prime mini-lifting body

SR-89774 Fly-back Titan II

SLOMAR

DYNA SOAR

RAPT

HL-10 STUDY

FDL-8

HASP

Martin projects listed above were applicable to inspect, maintain and support Bell or Martin's manned and robotic Orbital Bombardment Platform proposals, crew-changes and resupply of Space Stations, etc. They offered both lifting body and lenticular plus Greatly enlarged and very heavy Dyna Soar Bombers and other spacecraft known as "SLOMAR" for a multitude of USAF missions. Martin also designed their own versions of highly modified boost-glider and lifting body spacecraft derived from the START Program. It must be noted that the plethora of U.S. Industry spacecraft designs, proposals, and Dyna Soar were to be incorporated into the still classified SR-181 Strategic Orbital System composing the hardware of the USAF planned SR-181 EOMSF... Earth Orbital Military Space Force studied between 1957-1963.

Source; numerous Martin Dyna Soar Reports and Proposal Booklets.

Boeing Airplane Company

Few German scientists and engineers worked for BAC and are unidentified.

MX-2145 Study.

SR-168 Air-Launch Glide Missile

SR-126 RoBo.

SR-178 GSS.

SR-181 Strategic Orbital System

ABMD Orbital Interceptor or Boeing nomenclature...AICBM interceptor.proposal.

SR-79500 Hypersonic Glide Misisle

ICGM

BOSS-IOC

BOSS-WEDGE

R464 a.k.a. RS620A Dyna Soar I

There are numerous contracts that either remain classified or have been destroyed by the contractor or have been buried by the Dod/USAF.

End APPENDIX I Comment by Anonymous

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Thanks

Joseph

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